

SEQUENCE LISTING

<110> Burgin, Alex B.  
Stewart, Lance J.

<120> Use of Phosphorothiolate Polynucleotides  
In Ligating Nucleic Acids

<130> P-RD 4806

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<151> 2001-05-10

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Arg Ala Ser Gly Asp Ala Lys Ile Lys Lys Glu Lys Glu Asn Gly Phe	
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Ser Ser Pro Pro Gln Ile Lys Asp Glu Pro Glu Asp Asp Gly Tyr Phe	
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gtt cct cct aaa gag gat ata aag cca tta aag aga cct cga gat gag	672
Val Pro Pro Lys Glu Asp Ile Lys Pro Leu Lys Arg Pro Arg Asp Glu	
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gat gat gct gat tat aaa cct aag aaa att aaa aca gaa gat acc aag	720
Asp Asp Ala Asp Tyr Lys Pro Lys Lys Ile Lys Thr Glu Asp Thr Lys	
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Lys Glu Lys Lys Arg Lys Leu Glu Glu Glu Glu Asp Gly Lys Leu Lys	
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Lys Pro Lys Asn Lys Asp Lys Asp Lys Lys Val Pro Glu Pro Asp Asn	
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Lys Gly Pro Val Phe Ala Pro Pro Tyr Glu Pro Leu Pro Glu Asn Val	
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acc cag atg agc cag tat ttc aaa gcc cag acg gaa gct cgg aaa cag	1200
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Leu Lys Glu Tyr Gly Phe Cys Ile Met Asp Asn His Lys Glu Arg Ile	
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Ala Asn Phe Lys Ile Glu Pro Pro Gly Leu Phe Arg Gly Arg Gly Asn	
355 360 365	
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His Pro Lys Met Gly Met Leu Lys Arg Arg Ile Met Pro Glu Asp Ile	
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atc atc aac tgt agc aaa gat gcc aag gtt cct tct cct cct cca gga	1440
Ile Ile Asn Cys Ser Lys Asp Ala Lys Val Pro Ser Pro Pro Pro Gly	
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His Lys Trp Lys Glu Val Arg His Asp Asn Lys Val Thr Trp Leu Val	
400 405 410	
tcc tgg aca gag aac atc caa ggt tcc att aaa tac atc atg ctt aac	1536
Ser Trp Thr Glu Asn Ile Gln Gly Ser Ile Lys Tyr Ile Met Leu Asn	
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Pro Ser Ser Arg Ile Lys Gly Glu Lys Asp Trp Gln Lys Tyr Glu Thr	
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Ala Arg Arg Leu Lys Lys Cys Val Asp Lys Ile Arg Asn Gln Tyr Arg	
450 455 460	
gaa gac tgg aag tcc aaa gag atg aaa gtc cgg cag aga gct gta gcc	1680
Glu Asp Trp Lys Ser Lys Glu Met Lys Val Arg Gln Arg Ala Val Ala	
465 470 475	
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Leu Tyr Phe Ile Asp Lys Leu Ala Leu Arg Ala Gly Asn Glu Lys Glu	
480 485 490	
gaa gga gaa aca gcg gac act gtg ggc tgc tgc tca ctt cgt gtg gag	1776
Glu Gly Glu Thr Ala Asp Thr Val Gly Cys Cys Ser Leu Arg Val Glu	

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His Ile Asn Leu His Pro Glu Leu Asp Gly Gln Glu Tyr Val Val Glu				
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ttt gac ttc ctc ggg aag gac tcc atc aga tac tat aac aag gtc cct				1872
Phe Asp Phe Leu Gly Lys Asp Ser Ile Arg Tyr Tyr Asn Lys Val Pro				
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Val Glu Lys Arg Val Phe Lys Asn Leu Gln Leu Phe Met Glu Asn Lys				
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Gln Pro Glu Asp Asp Leu Phe Asp Arg Leu Asn Thr Gly Ile Leu Asn				
560		565	570	
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Lys His Leu Gln Asp Leu Met Glu Gly Leu Thr Ala Lys Val Phe Arg				
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aca tac aat gcc tcc atc acg cta cag cag cag cta aaa gaa ctg aca				2064
Thr Tyr Asn Ala Ser Ile Thr Leu Gln Gln Gln Leu Lys Glu Leu Thr				
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gcc ccg gat gag aac atc cca gcg aag atc ctt tct tat aac cgt gcc				2112
Ala Pro Asp Glu Asn Ile Pro Ala Lys Ile Leu Ser Tyr Asn Arg Ala				
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Asn Arg Ala Val Ala Ile Leu Cys Asn His Gln Arg Ala Pro Pro Lys				
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655		660	665	670
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Asp Ala Lys Val Met Lys Asp Ala Lys Thr Lys Lys Val Val Glu Ser				
675		680	685	
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Lys Lys Lys Ala Val Gln Arg Leu Glu Glu Gln Leu Met Lys Leu Glu				
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735 740 745 750

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<212> PRT

<213> Homo sapiens

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His Ser Asn Ser Glu His Lys Asp Ser Glu Lys Lys His Lys Glu Lys  
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85 90 95  
Ser Gly Asp Ala Lys Ile Lys Lys Glu Lys Glu Asn Gly Phe Ser Ser

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Lys Asn Lys Asp Lys Asp Lys	Lys Val Pro Glu Pro Asp Asn Lys Lys	
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Tyr Tyr Asp Gly Lys Val Met	Lys Leu Ser Pro Lys Ala Glu Glu Val	
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Glu Glu Lys Asn Ile Ile Thr	Asn Leu Ser Lys Cys Asp Phe Thr Gln	
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Phe Lys Ile Glu Pro Pro Gly	Leu Phe Arg Gly Arg Gly Asn His Pro	
355	360	365
Lys Met Gly Met Leu Lys Arg	Arg Ile Met Pro Glu Asp Ile Ile Ile	
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385	390	395
Trp Lys Glu Val Arg His Asp	Asn Lys Val Thr Trp Leu Val Ser Trp	
405	410	415
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565 570 575  
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580 585 590  
Asn Ala Ser Ile Thr Leu Gln Gln Gln Leu Lys Glu Leu Thr Ala Pro  
595 600 605  
Asp Glu Asn Ile Pro Ala Lys Ile Leu Ser Tyr Asn Arg Ala Asn Arg  
610 615 620  
Ala Val Ala Ile Leu Cys Asn His Gln Arg Ala Pro Pro Lys Thr Phe  
625 630 635 640  
Glu Lys Ser Met Met Asn Leu Gln Thr Lys Ile Asp Ala Lys Lys Glu  
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Gln Leu Ala Asp Ala Arg Arg Asp Leu Lys Ser Ala Lys Ala Asp Ala  
660 665 670  
Lys Val Met Lys Asp Ala Lys Thr Lys Lys Val Val Glu Ser Lys Lys  
675 680 685  
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690 695 700  
Ala Thr Asp Arg Glu Glu Asn Lys Gln Ile Ala Leu Gly Thr Ser Lys  
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Leu Asn Tyr Leu Asp Pro Arg Ile Thr Val Ala Trp Cys Lys Lys Trp  
725 730 735  
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His Ile Glu Gly Arg Ile Lys Trp Lys Phe Leu Glu His Lys Gly Pro  
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100 105 110	
agc cag tat ttc aaa gcc cag acg gaa gct cgg aaa cag atg agc aag	384
Ser Gln Tyr Phe Lys Ala Gln Thr Glu Ala Arg Lys Gln Met Ser Lys	
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Tyr Gly Phe Cys Ile Met Asp Asn His Lys Glu Arg Ile Ala Asn Phe	
145 150 155 160	
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Lys Ile Glu Pro Pro Gly Leu Phe Arg Gly Arg Gly Asn His Pro Lys	
165 170 175	
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Met Gly Met Leu Lys Arg Arg Ile Met Pro Glu Asp Ile Ile Ile Asn	
180 185 190	
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Cys Ser Lys Asp Ala Lys Val Pro Ser Pro Pro Pro Gly His Lys Trp	
195 200 205	
aaa gaa gtc cgg cat gat aac aag gtt act tgg ctg gtt tcc tgg aca	672
Lys Glu Val Arg His Asp Asn Lys Val Thr Trp Leu Val Ser Trp Thr	
210 215 220	
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225 230 235 240	
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Arg Ile Lys Gly Glu Lys Asp Trp Gln Lys Tyr Glu Thr Ala Arg Arg	



245	250	255	
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Leu Lys Lys Cys Val Asp Lys Ile Arg Asn Gln Tyr Arg Glu Asp Trp			
260	265	270	
aag tcc aaa gag atg aaa gtc cgg cag aga gct gta gcc ctg tac ttc			864
Lys Ser Lys Glu Met Lys Val Arg Gln Arg Ala Val Ala Leu Tyr Phe			
275	280	285	
atc gac aag ctt gct ctg aga gca ggc aat gaa aag gag gaa gga gaa			912
Ile Asp Lys Leu Ala Leu Arg Ala Gly Asn Glu Lys Glu Glu Gly Glu			
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Thr Ala Asp Thr Val Gly Cys Cys Ser Leu Arg Val Glu His Ile Asn			
305	310	315	320
cta cac cca gag ttg gat ggt cag gaa tat gtg gta gag ttt gac ttc			1008
Leu His Pro Glu Leu Asp Gly Gln Glu Tyr Val Val Glu Phe Asp Phe			
325	330	335	
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Leu Gly Lys Asp Ser Ile Arg Tyr Tyr Asn Lys Val Pro Val Glu Lys			
340	345	350	
cga gtt ttt aag aac cta caa cta ttt atg gag aac aag cag ccc gag			1104
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355	360	365	
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Asp Asp Leu Phe Asp Arg Leu Asn Thr Gly Ile Leu Asn Lys His Leu			
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Gln Asp Leu Met Glu Gly Leu Thr Ala Lys Val Phe Arg Thr Tyr Asn			
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gcc tcc atc acg cta cag cag cag cta aaa gaa ctg aca gcc ccg gat			1248
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Val Ala Ile Leu Cys Asn His Gln Arg Ala Pro Pro Lys Thr Phe Glu			
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aag tct atg atg aac ttg caa act aag att gat gcc aag aag gaa cag			1392
Lys Ser Met Met Asn Leu Gln Thr Lys Ile Asp Ala Lys Lys Glu Gln			
450	455	460	

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aat tat ctg gac cct agg atc aca gtg gct tgg tgc aag aag tgg ggt 1632  
 Asn Tyr Leu Asp Pro Arg Ile Thr Val Ala Trp Cys Lys Lys Trp Gly  
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 Tyr Asp Gly Lys Val Met Lys Leu Ser Pro Lys Ala Glu Glu Val Ala  
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 65 70 75 80  
 Phe Arg Lys Asn Phe Phe Lys Asp Trp Arg Lys Glu Met Thr Asn Glu  
 85 90 95  
 Glu Lys Asn Ile Ile Thr Asn Leu Ser Lys Cys Asp Phe Thr Gln Met  
 100 105 110

Ser Gln Tyr Phe Lys Ala Gln Thr Glu Ala Arg Lys Gln Met Ser Lys  
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Glu Glu Lys Leu Lys Ile Lys Glu Glu Asn Glu Lys Leu Leu Lys Glu  
130 135 140  
Tyr Gly Phe Cys Ile Met Asp Asn His Lys Glu Arg Ile Ala Asn Phe  
145 150 155 160  
Lys Ile Glu Pro Pro Gly Leu Phe Arg Gly Arg Gly Asn His Pro Lys  
165 170 175  
Met Gly Met Leu Lys Arg Arg Ile Met Pro Glu Asp Ile Ile Ile Asn  
180 185 190  
Cys Ser Lys Asp Ala Lys Val Pro Ser Pro Pro Gly His Lys Trp  
195 200 205  
Lys Glu Val Arg His Asp Asn Lys Val Thr Trp Leu Val Ser Trp Thr  
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Glu Asn Ile Gln Gly Ser Ile Lys Tyr Ile Met Leu Asn Pro Ser Ser  
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Arg Ile Lys Gly Glu Lys Asp Trp Gln Lys Tyr Glu Thr Ala Arg Arg  
245 250 255  
Leu Lys Lys Cys Val Asp Lys Ile Arg Asn Gln Tyr Arg Glu Asp Trp  
260 265 270  
Lys Ser Lys Glu Met Lys Val Arg Gln Arg Ala Val Ala Leu Tyr Phe  
275 280 285  
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Thr Ala Asp Thr Val Gly Cys Cys Ser Leu Arg Val Glu His Ile Asn  
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Leu His Pro Glu Leu Asp Gly Gln Glu Tyr Val Val Glu Phe Asp Phe  
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Leu Gly Lys Asp Ser Ile Arg Tyr Tyr Asn Lys Val Pro Val Glu Lys  
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Arg Val Phe Lys Asn Leu Gln Leu Phe Met Glu Asn Lys Gln Pro Glu  
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Asp Asp Leu Phe Asp Arg Leu Asn Thr Gly Ile Leu Asn Lys His Leu  
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Gln Asp Leu Met Glu Gly Leu Thr Ala Lys Val Phe Arg Thr Tyr Asn  
385 390 395 400  
Ala Ser Ile Thr Leu Gln Gln Gln Leu Lys Glu Leu Thr Ala Pro Asp  
405 410 415  
Glu Asn Ile Pro Ala Lys Ile Leu Ser Tyr Asn Arg Ala Asn Arg Ala  
420 425 430  
Val Ala Ile Leu Cys Asn His Gln Arg Ala Pro Pro Lys Thr Phe Glu  
435 440 445  
Lys Ser Met Met Asn Leu Gln Thr Lys Ile Asp Ala Lys Lys Glu Gln  
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Leu Ala Asp Ala Arg Arg Asp Leu Lys Ser Ala Lys Ala Asp Ala Lys  
465 470 475 480  
Val Met Lys Asp Ala Lys Thr Lys Lys Val Val Glu Ser Lys Lys Lys  
485 490 495  
Ala Val Gln Arg Leu Glu Glu Gln Leu Met Lys Leu Glu Val Gln Ala  
500 505 510  
Thr Asp Arg Glu Glu Asn Lys Gln Ile Ala Leu Gly Thr Ser Lys Leu  
515 520 525  
Asn Tyr Leu Asp Pro Arg Ile Thr Val Ala Trp Cys Lys Lys Trp Gly

530	535	540
Val Pro Ile Glu Lys Ile Tyr Asn Lys Thr Gln Arg Glu Lys Phe Ala		
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